

IN THE CLAIMS

Please amend the claims as follows:

1 (Currently Amended). ~~Blind~~ A blind or partially blind process to determine ~~characteristics~~ characteristic space-time parameters of a propagation channel in a system comprising at least one reception sensor ~~receiving a signal y(t), the process comprising:~~

receiving a signal y(t) with the at least one reception sensor;

~~characterized in that it comprises at least one step in which the specular type structure of the channel is used and a step for the joint determination of parameters such as~~

determining antenna vectors (a) and time vectors (τ) starting from second order statistics of the received signals based on a specular structure of the propagation channel;

selecting a length of the propagation channel \hat{L} such that $\hat{L} \geq Lg + \Delta\tau_{\max}$, where Lg denotes a filter length and $\Delta\tau_{\max}$ denotes a largest possible value of a relative delay between two paths, and a value of a number of observations K satisfies $K \geq \hat{L}$;

determining a sub-space criterion matrix $Q_{\hat{L}}(\hat{R})$, where \hat{R} denotes a covariance matrix;

estimating a number of paths \hat{d} ;

estimating delays $\hat{\tau}$, where $\hat{\tau} = \arg \min_{\tau} J_{\hat{L}, \hat{d}}(\tau)$, where

$$J_{\hat{L}, \hat{d}}(\tau) = \frac{\lambda_{\min}(G_{\hat{L}, \hat{d}}(\tau)^H Q_{\hat{L}}(\hat{R}) G_{\hat{L}, \hat{d}}(\tau))}{\lambda_{\min}(G_{\hat{L}, \hat{d}}(\tau)^H G_{\hat{L}, \hat{d}}(\tau))} + \lambda_{\min}$$

denotes a smallest eigenvalue of a matrix,

and $(G_{\hat{L}, \hat{d}}(\tau))$ denotes a matrix containing delayed sampled versions of the received signal;

estimating a value of an antenna vector \hat{a} by $\hat{a} = v_{p_{\min}}(G_{\hat{L}, \hat{d}}(\tau)^H Q_{\hat{L}}(\hat{R}) G_{\hat{L}, \hat{d}}(\hat{\tau}))$, where

$v_{p_{\min}}$ denotes an eigenvector associated with λ_{\min} ; and

forming an estimate of a pulse response \hat{h} such that $\hat{h} = G_{L,d}(\tau)\hat{a}$.

2 (Currently Amended). ~~Process~~ The process according to claim 1, ~~characterized in that it comprises a step in which the received signal is oversampled.~~ further comprising:
oversampling the received signal.

3 (Currently Amended). ~~Process~~ The process according to claim 1, ~~characterized in that it comprises a step in which the signals are received on at least two sensors and a step in which the received signal is oversampled.~~ wherein the receiving includes receiving the signal on at least two sensors, and the method further comprises:
oversampling the received signal.

4 (Currently Amended). ~~Process~~ The process according to ~~any one of claims 2 and claim 3, characterized in that the~~ wherein a sampling period corresponds to T/p , where T is the ~~denotes a symbol period and p denotes a number of outputs on each sensor.~~

5 (Canceled).

6 (Currently Amended). ~~Process according to one of claims 1 to 4, characterized in that it comprises at least the following steps:~~

A blind or partially blind process to determine characteristic space-time parameters of a propagation channel in a system comprising at least one reception sensor, the process comprising:

receiving a signal $y(t)$ with the at least one reception sensor;

determining antenna vectors (a) and time vectors (τ) starting from second order statistics of the received signals based on a specular structure of the propagation channel;

• ~~Estimate~~ estimating $\hat{L}g$, which denotes a the length of the a transmission filter and ~~choose~~ choosing \hat{L} such that $\hat{L} \geq \hat{L}g + \Delta\tau_{\max}$ and $K \geq \hat{L}$, where \hat{L} denotes a length of the propagation channel, $\Delta\tau_{\max}$ denotes a largest possible value of a relative delay between two paths, and K denotes a value of a number of observations;

• ~~Apply the sub-space method described in item 2 of the priori process:~~

determining a sub-space criterion $Q_L(\hat{R})$, said determining including,

— ~~Estimate~~ estimating a the covariance matrix \hat{R} , [[.]]

— ~~Calculate the~~ calculating a projection matrix onto noise space $\hat{\Pi}_L$ using the eigenvectors associated with the $pq(K+1) - (K + \hat{L} + 1)$ null eigenvalues of the covariance matrix \hat{R} , where q denotes a number of reception sensors and p denotes a number of outputs on each sensor, and[[.]]

— ~~Form the~~ forming matrix $Q_L(\hat{R}) = D_L(\hat{\Pi}_L)D_L(\hat{\Pi}_L)^H$;

— ~~Obtain the~~ obtaining an \bar{h} eigenvector associated with the a smallest eigenvalue of the matrix $Q_L(\hat{R})$ and ~~form~~ forming $\hat{h}_{\frac{T}{p}}(z)$, which represents a discrete response and T/p denotes a sampling rate, where T denotes a symbol period;

• ~~Form the new parametric criterion:~~

— ~~Choose~~ choosing the a value of the propagation channel length such that

$$R \geq \hat{L}_{\frac{T}{p}} = p(\hat{L} + 1) - 1;$$

~~And form the~~ forming a matrix $\tau_R(\hat{h}_{\frac{T}{p}})$;

~~Calculate the calculating a matrix~~ $\hat{\Omega}_{\frac{\hat{L}_T}{p}}$ containing the eigenvectors associated with

the $q(R+1) - (R + \frac{\hat{L}_T}{p} + 1)$ smallest eigenvalues of τ_{R_i}

~~Form forming the matrix~~ $D_{\frac{\hat{L}_T}{p}}(\hat{\Omega}_{\frac{\hat{L}_T}{p}})$;

• ~~Estimate the estimating a number of paths~~ \hat{d} ; [[,]]

• ~~Choose choosing~~ $\tilde{v}(t)$ [[,]] ~~to have a continuous filter with a limited band~~ $B[[,]]$ and

forming ~~Form the filter~~ $v(t)$,

$$\frac{v(t) = \tilde{v}(t)}{v(t) = 0} \quad \begin{matrix} 0 \leq t \leq Lv \leq \hat{L}g \\ \text{elsewhere} \end{matrix}$$

• ~~Estimate the estimating delays~~ $\hat{\tau}$ ~~such that~~ $\hat{\tau} = \arg \min_{\tau} I_{\hat{L}, \hat{d}}(\tau)$,

where

$$I_{\hat{L}, \hat{d}}(\tau) = \frac{\lambda_{\min}(V_{\hat{L}, \hat{d}}(\tau)^H D_{\frac{\hat{L}_T}{p}}(\hat{\Omega}_{\frac{\hat{L}_T}{p}}) D_{\frac{\hat{L}_T}{p}}(\hat{\Omega}_{\frac{\hat{L}_T}{p}})^H V_{\hat{L}, \hat{d}}(\tau))}{\lambda_{\min}(V_{\hat{L}, \hat{d}}(\tau)^H V_{\hat{L}, \hat{d}}(\tau))} \quad \lambda_{\min} \text{ denotes the smallest}$$

eigenvalue of a matrix, and $V_{\hat{L}, \hat{d}}(\tau)$ denotes a matrix containing delayed sample versions of the received signal; and

• ~~Estimate estimating a value of an antenna vectors: vector~~ \hat{a} ~~by~~

$$\hat{a} = vP_{\min}(V_{\hat{L}, \hat{d}}(\hat{\tau})^H D_{\frac{\hat{L}_T}{p}}(\hat{\Omega}_{\frac{\hat{L}_T}{p}}) D_{\frac{\hat{L}_T}{p}}(\hat{\Omega}_{\frac{\hat{L}_T}{p}})^H V_{\hat{L}, \hat{d}}(\hat{\tau})) \text{, where } vP_{\min} \text{ denotes an eigenvector}$$

associated with λ_{\min} :

7 (Currently Amended). ~~Application of the The process according to any one of~~
~~claims 1 to 6~~ claims 1 or 6, further comprising:

monitoring to monitor the a spectrum of [[a]] the propagation channel for positioning
purposes from one or several HF stations.

8 (Currently Amended). ~~Application of the~~ The process according to any one of
~~claims 1 to 6~~ claims 1 or 6, further comprising:

equalizing, positioning, or spatial filtering standard communication links for the
~~standard communication links for equalization or positioning or spatial filtering.~~

9 (New). The process according to claim 6, further comprising:
oversampling the received signal.

10 (New). The process according to claim 6, wherein the receiving includes receiving
the signal on at least two sensors, and the method further comprises:
oversampling the received signal.

11 (New). The process according to claim 10, wherein a sampling period corresponds
to T/p .